Objectives

- Evaluate the correlations between OHV use patterns and vegetation community characteristics.

- Response variables included:
  - Plant cover
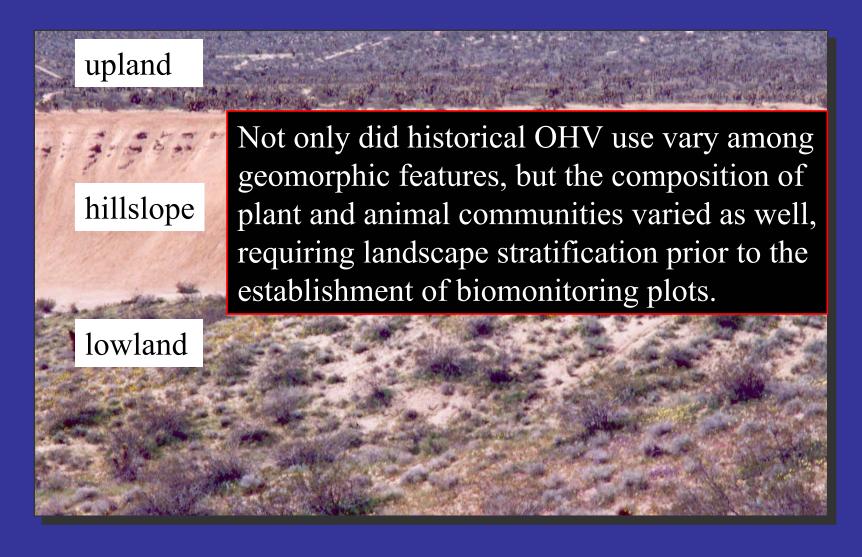 - Seedbank density
  - Species diversity

Methods
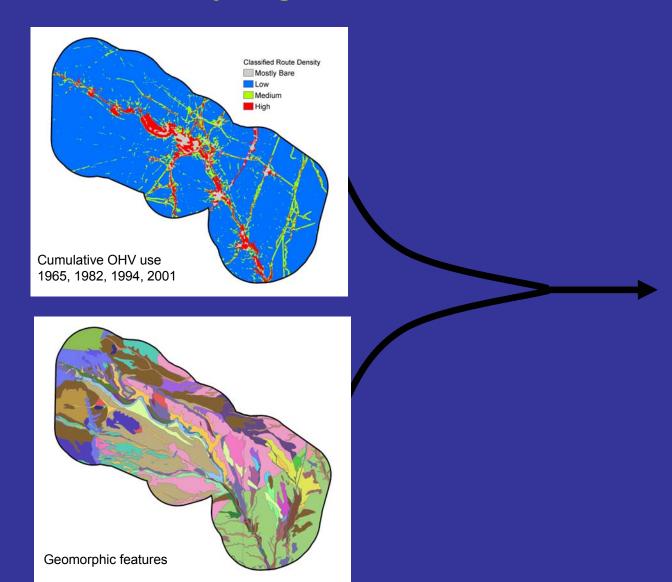
Digitize routes   **Map geomorphology**
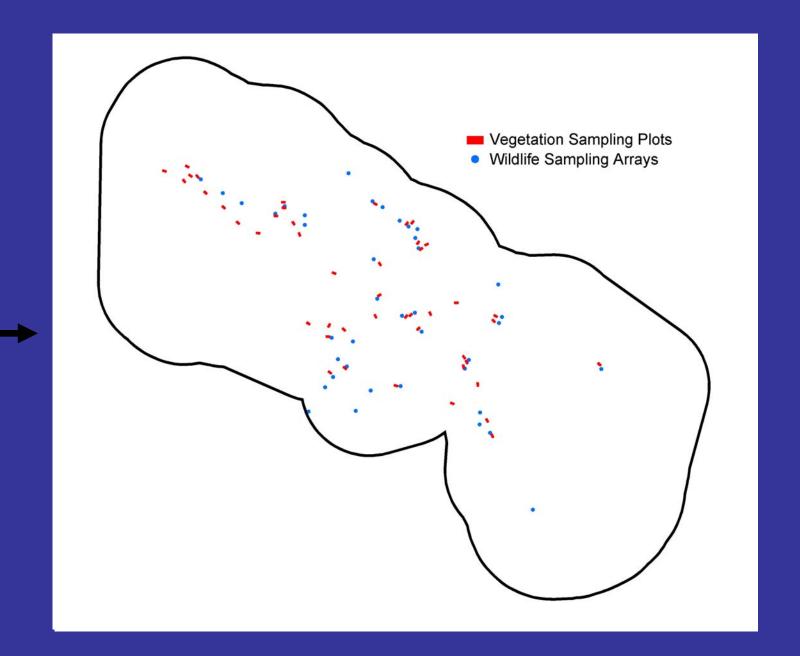
Stratify landscape for sampling

**Evaluate responses of plants
(using 0.1 ha mod-whit plots)**

Major geomorphic features at Dove Springs

upland
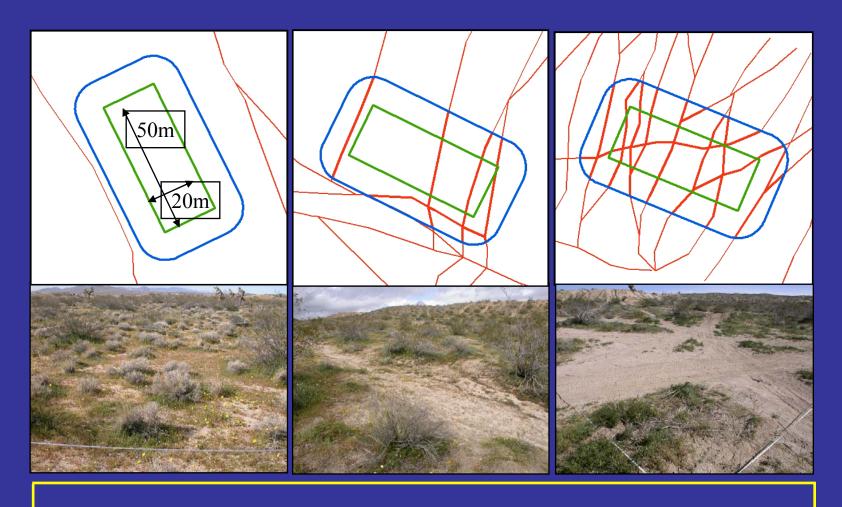
hillslope

lowland

Not only did historical OHV use vary among geomorphic features, but the composition of plant and animal communities varied as well, requiring landscape stratification prior to the establishment of biomonitoring plots.

Process for stratifying the landscape

Cumulative OHV use
1965, 1982, 1994, 2001

Classified Route Density
- Mostly Bare
- Low
- Medium
- High

Geomorphic features

Vegetation Sampling Plots
Wildlife Sampling Arrays

Examples of OHV Route Densities

50m

20m

0   Route Density (m/m²)   0.16
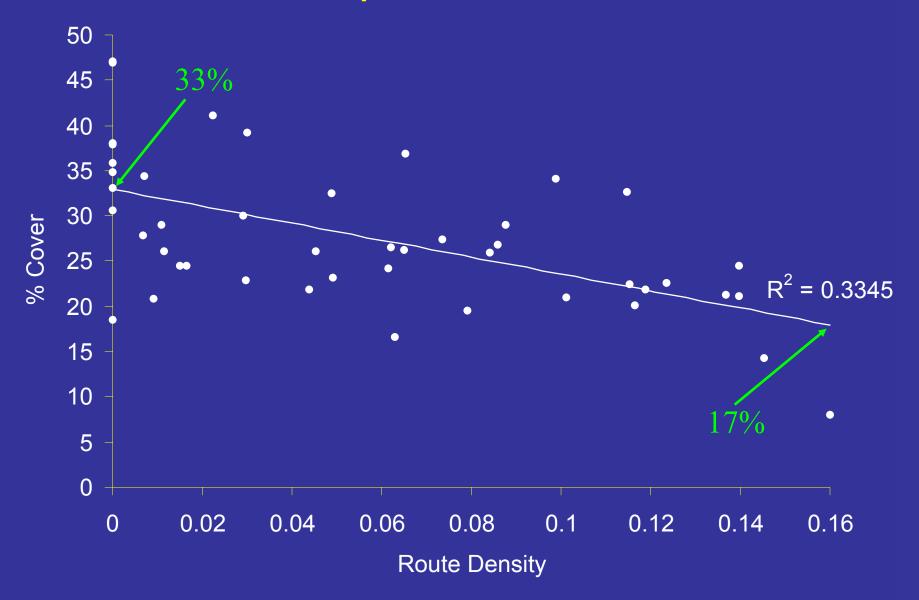
Basic statistical model

Response = geology, density, geology×density

lowland
upland
hill-slope
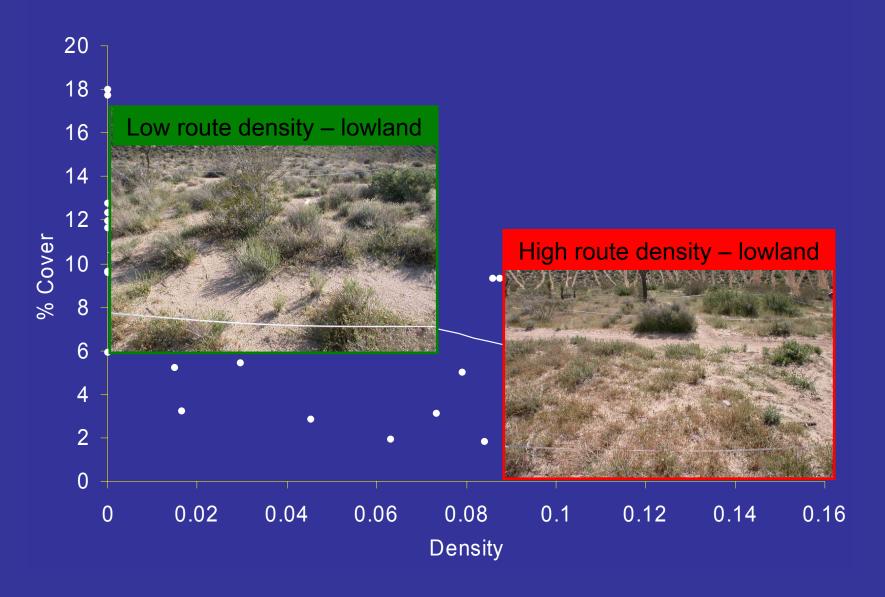
0 to 0.16 m/m^2

Univariate, multivariate, and ordination statistical methods were used.
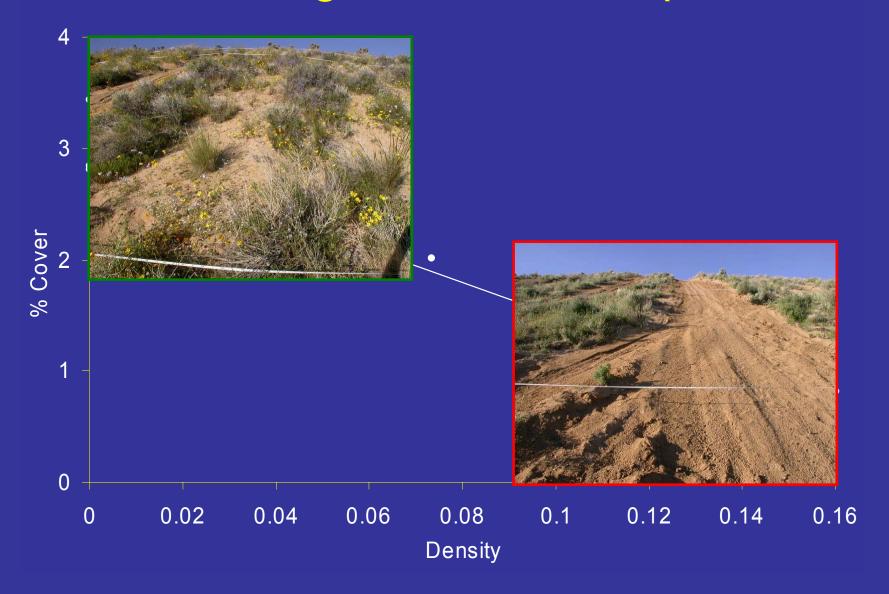
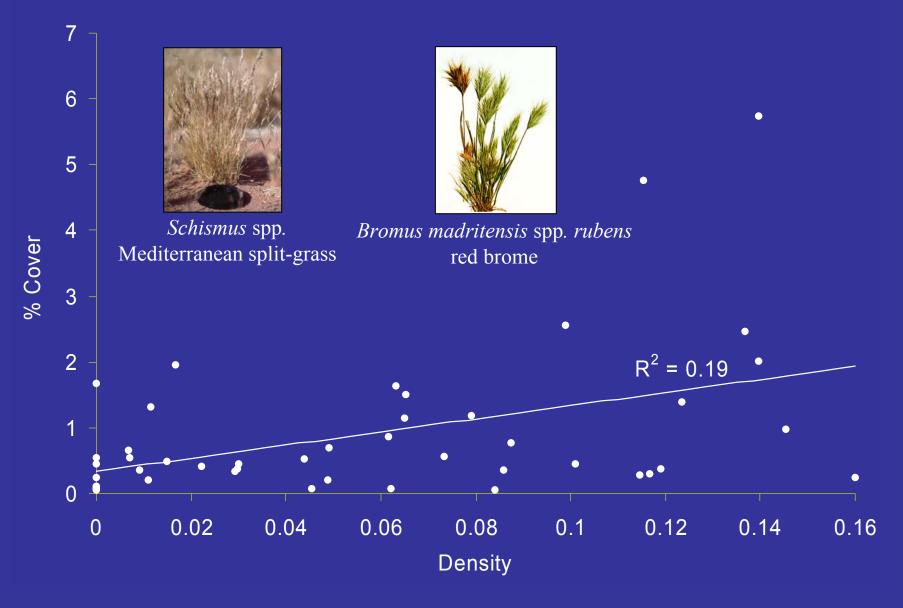# Total plant cover

% Cover vs Route Density scatter plot with trend line ($R^2 = 0.3345$), annotated with 33% and 17%.

Shrub cover

Low route density – lowland

High route density – lowland

% Cover

Density

Perennial grasses – Hillslopes

Alien annual grasses

Schismus spp.
Mediterranean split-grass

Bromus madritensis spp. *rubens*
red brome

$R^2 = 0.19$

% Cover

Density
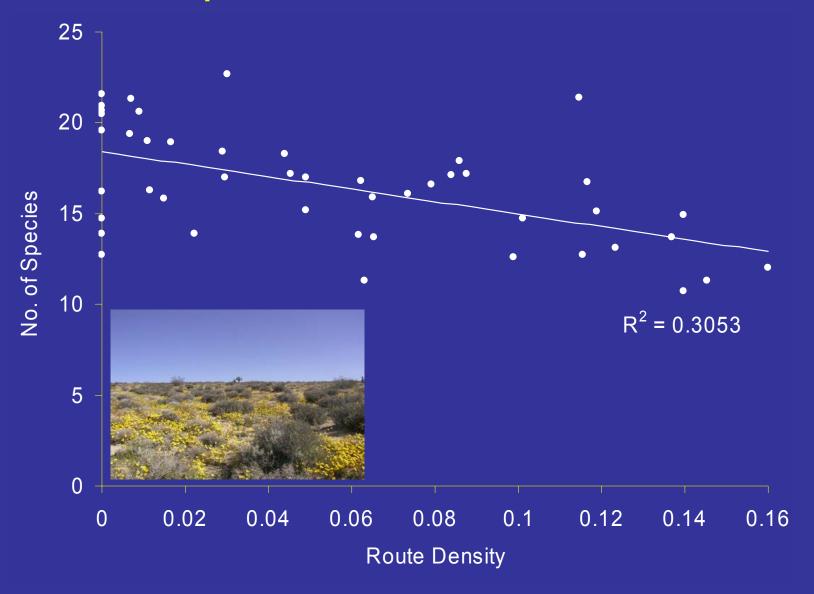
Increasers

Species	Lowland	Hill-slope	Upland
Amsinckia tesellata		↑	
Cryptantha micrantha	↑		↑
Gilia latiflora ssp. *daveyi*		↑	
Plagiobothrys arizonicus	↑		↑
Salazaria mexicana		↑	
Schismus barbatus	↑		↑
Eriastrum species		↑	
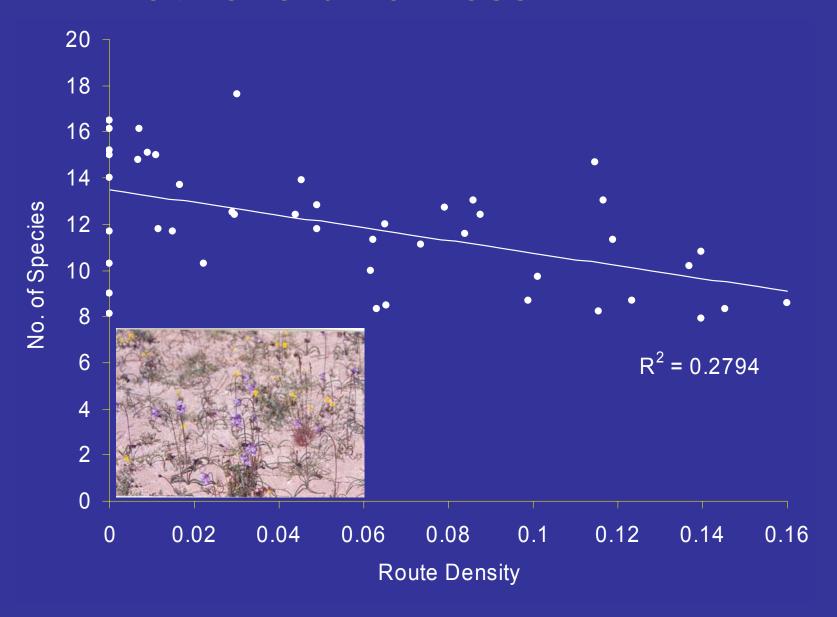
Decreasers

Species	Lowland	Hill-slope	Upland
Amsinckia tesellata			↓
Bromus trinii			↓
Chorizanthe watsonii			↓
Coleogyne ramosissima		↓	↓
Cryptantha pterocarya			↓
Elymus elymoides		↓	
Eriophyllum pringlei			↓
Erodium cicutarium	↓		
Grayia spinosa		↓	
Linanthus aureus			↓
Phacelia tanacetifolia		↓	
Poa secunda		↓	
Stephanomeria exigua		↓	
Tropidocarpum gracile			↓
Uropappus lindleyi		↓	
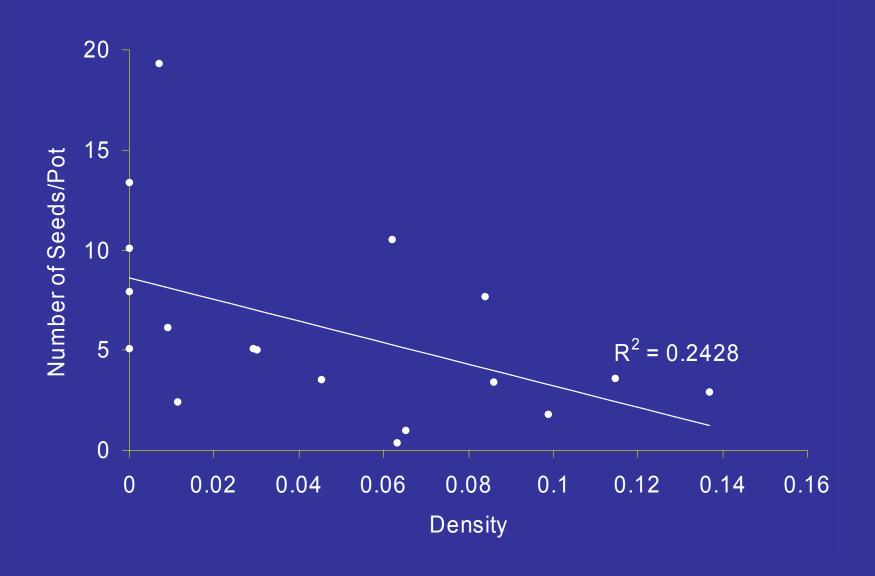
Total species richness – 1 m^2

$R^2 = 0.3053$
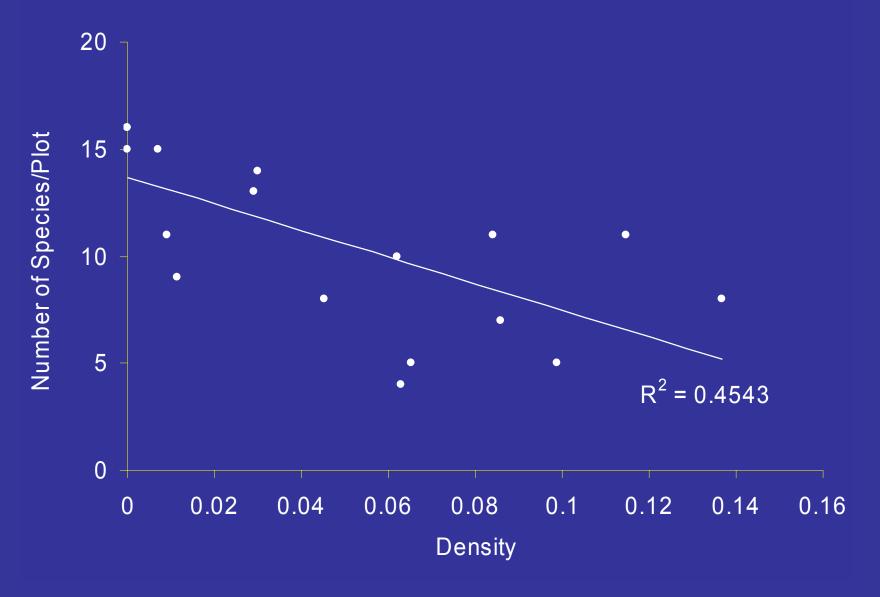
Native forb richness – 1 m^2

$R^2 = 0.2794$

Native forb seedbank density – Uplands

Native forb seedbank richness – Uplands

$R^2 = 0.4543$

Summary

- Increasing OHV use was <u>negatively</u> correlated with:
    - Plant cover
    - Seedbank density
    - Species diversity
- Increasing OHV use was <u>positively</u> correlated with:
    - Alien annual grass cover
- Trends were linear, with no apparent thresholds across the range of OHV track densities that we studied
- Results should be validated at other sites

Collaborators
Jim Weigand, BLM – California
Dave Miller, USGS – GD
Leila Gass, USGS – NMD
J.R. Matchett, USGS – BRD
Todd Esque, USGS – BRD